Digital Mammography: Hologic Selenia™

RADIOLOGICAL SERVICE TRAINING INSTITUTE

Introduction

Mammography may be the most dynamic of all of today's imaging modalities. With the new regulatory and accreditation procedures, and advancements in technology, the service professional is becoming more involved in maintaining the quality of the mammographic images produced. This course is designed to give the service professional the insight to evaluate image quality problems, determine if the mammographic unit is the source of the image problem and take the appropriate steps to correct the deficiency.

Given today's regulatory environment maintaining the system at peak performance is of the utmost importance.

At the completion of this course students will be able to perform all Selenia system maintenance procedures including:

- System installation
- Calibration
- Gantry maintenance
- DROC maintenance
- Imaging chain maintenance
- Detector pixel mapping
- Preventive maintenance
- Troubleshooting

Prerequisites

To attend this course, the service professional must have attended Phase I and possess fundamental knowledge and understanding of the principles of X-ray and basic electronics.

Objectives

- Identify the major components of the Selenia system
- Describe the functional characteristics of each sub-system of the Selenia system
- Describe the factors that affect digital mammographic image quality
- Describe how those factors are optimized to produce the highest quality digital mammographic images
- Complete all operator, administration, and application tasks
- Describe the function of the basic components of the Hologic Selenia mammographic unit
- Perform the necessary tests to reproduce the results of the physicist's report to confirm corrective action
- Perform all system calibrations and adjustments to maintain the highest quality images and compliance with MQSA requirements
- Perform detector related maintenance and Pixel mapping procedures to maintain detector image quality over time
- Demonstrate UNIX competence to be able to handle DROC maintenance, backup, restore, and calibrations
- Perform complete Preventive Maintenance procedures as performed by the OEM

Note: Due to copyright laws, students are required to purchase and bring to class a copy of the Selenia manuals set. Contact your dealer to order the manual set if you do not have the documentation with your system.

Example: Selenia Manual Set - P/N ASY-01516 includes:

(Updated P/N's with updated software may be available for purchase)

- 1 Manual, Selenia S/W Manual for Operators (1)
- 1 Manual, Selenia H/W Manual for Operators (2)
- 1 Manual, Selenia Installation and H/W Maintenance
- 1 Manual, Selenia Calibration and S/W Maintenance
- 1 Manual, Selenia AEC Cal
- 1 Manual, Selenia Admin Guide (AEC)
- 1 Manual, Selenia QC (AEC)
- 1 Manual, Selenia V3.X Quick Reference (AEC)
- 1 Manual, Selenia Schematics
- 1 Addendum, Selenia Install, Techmate UPS

Course Outline

Day 1

- Course introduction
- Selenia system
  - Components
  - Selenia terms/acronyms
  - System documentation
  - Manual set overview
- System logins
- Mammographic regulatory overview

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Hands-On Training Course
Course Length: 1 Week
CEU's Awarded: 4 CEU's
State of Ohio Registration No. 93-09-1377T

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- Digital mammography technology overview
- Direct vs. indirect digital capture
- Selenia quality control
- Functional checks
- Lab Activities
  - Major system component identification
  - System turn-on
  - System logins
  - System power-down
  - Technologist QC checks
  - Signal to noise
  - Flat field/Phantom IQ
- Selenia system basic operation
- Physicist evaluation testing
- Lab Activities
  - X-Ray to light congruence
  - kVP accuracy
  - HVL
  - AEC tracking
  - Tube output
  - Phantom image quality
  - Signal to noise ratio (SNR)
  - Detector ghosting

Day 2

- System power
  - AWS
  - Gantry
  - Brick
  - Detector
  - Turn-on circuits
- System communications
  - AWS
  - Sun blade computer
  - Fiber optic interface
  - Brick
  - Gantry
  - Detector
  - X-Ray controls
- Selenia operations
- AWS acquisition software
- Operators console
- User interface/application
  - Image acquisition
  - Image viewer
  - Screen considerations
- Lab Activities
  - Remove and replace covers and system panels
  - Component identification
    - AWS
    - Gantry
    - Brick
    - Detector
  - Component location
    - Schematic location
    - Physical location
    - Connector locations
    - Fuse location/identification
- Specifications
  - System specs
  - Detector specs
- Calibration overview
- Selenia networking
  - FTP
  - Networking configuration
- Basic UNIX
- Selenia Sun Solaris OS
- Selenia file system
  - Selenia scripts
  - Selenia configuration files
  - Permissions
  - File editing
- Lab Activities
  - AEC exposure examples and HTC grid
  - Configure Selenia networking components
  - Configure service laptop to FTP
  - Navigate Solaris file system
    - Locate detector config files
    - Locate calibration and backup scripts
    - Change file permissions

Day 3

- System administration
- Required tools and test equipment
- Required software
- AWS configuration
- Network configuration
- Device/output configuration
- Input devices
  - Barcode scanner
  - Modality worklist
- Lab Activities
  - Transfer calibration images to service laptop
  - Configure AWS
  - Configure network settings
  - Configure and test output devices
  - Configure and test input devices
- System integrity
- Backups
  - AWS
  - User preferences
- Restore system components from backup
- Sun Solaris operating system installation procedure
- AWS application installation procedure

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- Lab Activities
  - Backup AWS
  - Backup user preferences
  - Complete restore from backup
  - Clean Solaris OS install
  - Application install
  - System restore from previous backup

Day 4

- System service
- System calibration
  - kV regulation
  - Filament control
  - Rotor control
  - Motor controls
  - VTA
  - Collimator
  - Tubehead
- AEC calibration
- Selenia imaging chain
- Image and detector maintenance
- Detector calibration
- Lab Activities
  - kV calibration
  - mA calibration
  - Tubehead Adjustments
  - AEC calibration
  - Detector flat field calibration
  - Pixel mapping
  - Pixel mapping individual bad pixels
  - Pixel mapping detector lines Recalibrate newly mapped detector
- Preventive maintenance
- Review system diagrams and communication
- Review workstation utilities and service tools
- Lab Activities
  - Selenia PM worksheet

Day 5

- Troubleshooting
- Error codes
- System diagnostics
- Lab Activities (time permitting)
  - Troubleshooting using defective/bug boards
  - Using Service Tools & Diagnostics
- Course review
- Course evaluation
- Final exam